

## **Stomatal density and its relationship to growth habit in avocado**

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### **SYNOPSIS**

*Other trees besides Colin V-33 have shown a dwarfed growth habit at Coatepec Harinas, Mexico. These are CICTAMEX 96 PJ, CICTAMEX 11.9 PPaA and CICTAMEX 160 PF1. All these mutants coming from Fuerte and CICTAMEX 13 PJ III, CICTAMEX 121 PJ III both mutants derived from Rincon. A study to find a relationship between stomatal density and growth habit was carried out using trees above 11 years old. Colin V-33 (dwarf), Colinmex (intermediate) and Fuerte (standard) were also included in this study. Stomata counting was done using quickfix film replica under a 40 x 12, 5x microscope field. Height of the scion, scion-trunk circumference and canopy diameter were measured and a correlation analysis performed. Highly significant correlations were obtained among stomatal density and height ( $r = -0,95^{**}$ ), stomatal density and scion-trunk circumference ( $r = -0,85^{**}$ ) and stomatal density and canopy diameter ( $r = -0,91^{**}$ ). Highly significant positive correlations were also found among the growth parameters studied.*

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### **INTRODUCTION**

Sanchez (1980) reports that Colin V-33, is a dwarf avocado tree. Other trees besides Colin V-33 have shown a dwarf growth habit at Coatepec Harinas, Mexico.

Barrientos & Sanchez (1982) indicate the feasibility of selecting avocado dwarfing plants using stomatal counting. This research was carried out to study if there is a relationship between stomatal density and growth habit.

### **MATERIAL AND METHODS**

The trees studied were CICTAMEX 96 PJ, CICTAMEX 119 PPaA, CICTAMEX 160 PF1 (Figure 1). All these dwarf mutants come from Fuerte and CICTAMEX 13 PJ III, CICTAMEX 121 PJ III both dwarf mutants derived from Rincon. Colinmex (intermediate), Colin V33 (dwarf, Figure 2), Fuerte (standard) and the Boyce seedling COBA 2, were also included.

Stomata counting was done using quickfix film replica under a 40 x 12,5 x microscope field. One hundred observations per tree was done in five mature leaf samples.

Scion height, scion-trunk circumference and canopy diameter were measured and a correlation analysis performed to find the degree of association with the stomatal density. COBA 2 was not included in this analysis.

## RESULTS

Stomatal density varied from 23,68 to 85,3 per area of microscope field (40 x 12,5 x) (Figure 3). Dwarf trees showed a stomatal density between 74,05 and 85,3. In Colinmex for Fuerte 41,10.

Highly significant negative correlations were obtained among stomatal density and height, stomatal density and scion-trunk circumference and between stomatal density and canopy diameter (Table 1). Highly significant positive correlations were found among the growth parameters studied.

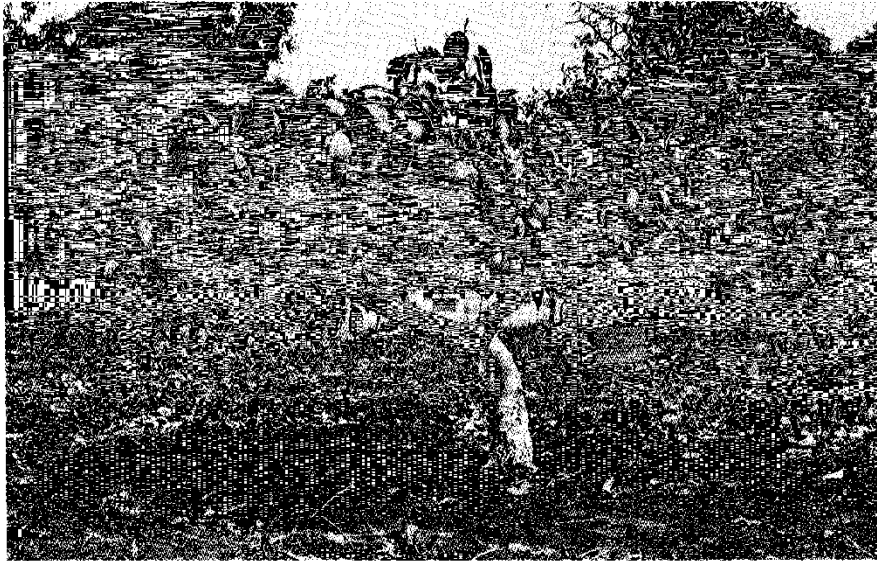


Fig 1 Cv Fuerte avocado dwarf mutant Cictamex 119 PPaA 11 years old.

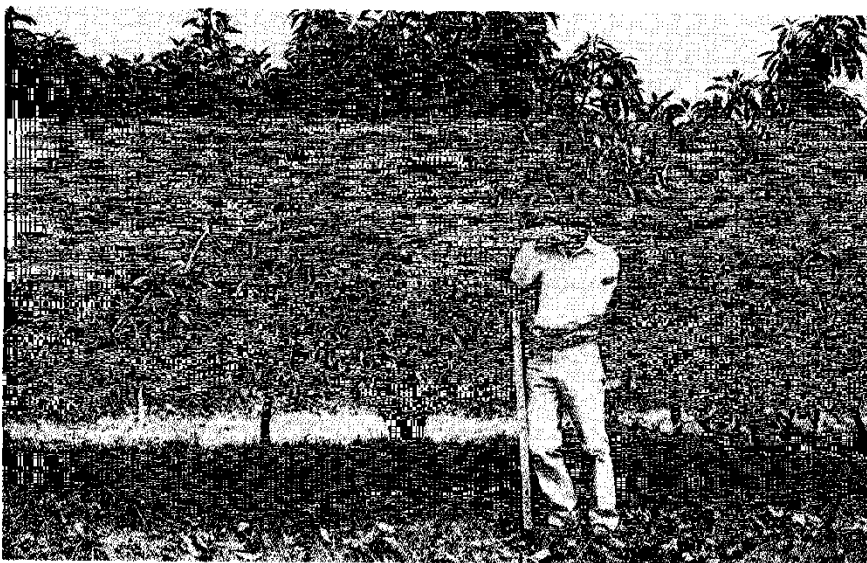


Fig 2 Guillermo Colin showing avocado fruits of a 16-year-old cv Colin V-33.

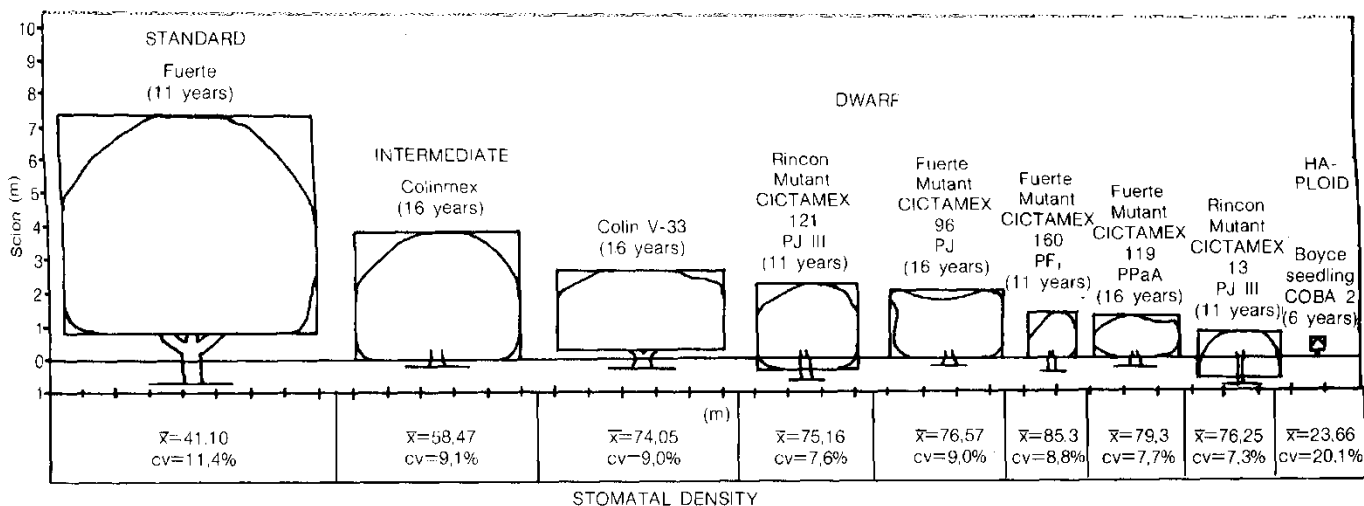


Fig 3 The stomatal density of some avocado trees and their growth habit.

TABLE 1 Coefficients of correlation	
Variable	Coefficient of correlation
Stomata-height	-0,958**
Stomata-trunk circumference	-0,851**
Stomata-canopy diameter	-0,919**
Height-trunk circumference	0,878**
Height-canopy diameter	0,948**
Trunk circumference-canopy diameter	0,947**
**Significant at 1%.	

## DISCUSSION

The results are similar to the findings of Barrientos & Sanchez (1982) in relation to the number of stomata and the growth habit of avocado trees. Figure 3 shows the trend of dwarf trees to have a higher stomatal density than intermediate and standard trees. In the special case of COBA 2 a low number of stomata (23,68), almost half of a standard tree was found. This tree has narrow and long leaves, and dwarf growth and shows different characteristics to a normal tree. Probably it is a haploid. However, the authors have not checked this.

According to the results of stomatal counting this technique could be a good method to classify the growth habit of avocado trees.

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